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Effect of duration and temperature of previous vacuum-packed storage on the microbiological quality of Belgian Blue meat packed in high-oxygen atmosphere

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INTRODUCTION

Modes of processing, distribution and consumption of fresh meat have dramatically changed over the past decades, resulting in a reorganization of the meat industry. Whilst vacuum packaging (VP) is almost exclusively reserved to the intermediate levels of the beef chain, modified atmosphere packaging (MAP) is more common in the retail marketplace.

The shelf life of fresh meat is mainly limited by alteration phenomena and microbial growth that can degrade its organoleptic properties. In this way, a major challenge for the fresh meat industry is to maintain the fresh appearance of this product.

OBJECTIVE

To study the effect of duration and temperature of previous vacuum-packaged storage on the microbiological quality of Belgian Blue (BB) beef packed in high-oxygen atmosphere.

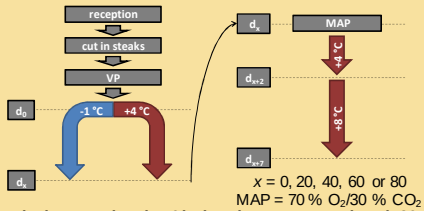
MATERIALS AND METHODS

Samples

Vacuum-packed striploins were supplied 2 days after slaugther.

Animal category	Age (yr)	Quantity
bulls	1.81 ± 0.10	4
culled cows	4.99 ± 0.58	4

Experimental design



x = 0, 20, 40, 60 or 80
MAP = 70 % O_2/30 % CO_2

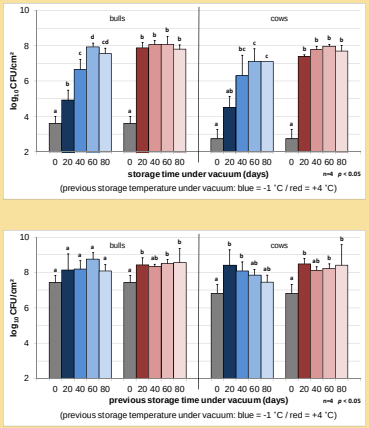
Analysis started at day 0(+7) and were repeated each 20 d

Microbiological counts

Total viable count (bioMérieux TEMPO®)
Lactic acid bacteria (bioMérieux TEMPO®)
Enterobacteriaceae (bioMérieux TEMPO®)
Pseudomonas spp. (ISO 13720 : 1995)
Brochothrix thermosphacta (ISO 13722 : 1996)

RESULTS AND DISCUSSION

Total viable count

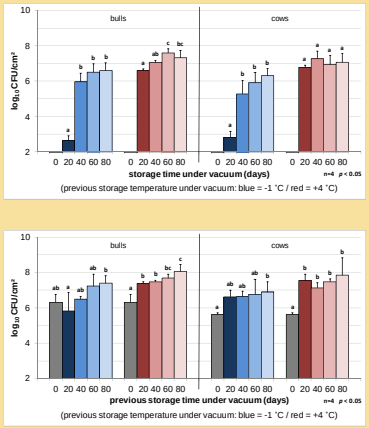


VP

MAP

The difference in TVC between temperatures tended to disapear after the 20th day once the meats were repacked under MA.

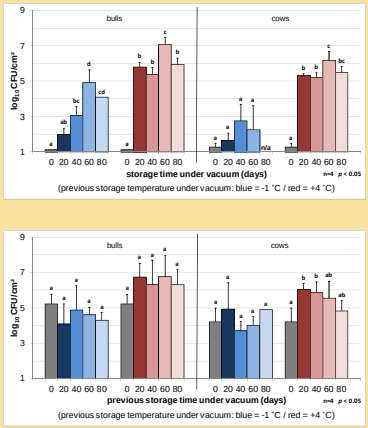
Lactic acid bacteria



VP

MAP

Enterobacteriaceae



Conversely, the difference in LAB and *Enterobacteriaceae* counts tended to be maintained after modified atmosphere repackaging.

Pseudomonas spp.

The counts of *Pseudomonas* spp. stayed below the counting limit for all studied treatments.

Brochothrix thermosphacta

Surprisingly, the counts of *Brochothrix thermosphacta* on samples repacked under modified atmosphere tended to decrease over time, probably due to the growth of a competing flora.

CONCLUSIONS

The difference in LAB and *Enterobacteriaceae* counts over time and between storage temperature showed that duration and temperature of VP storage had influence on microbiological quality of BB meat subsequently stored in high-oxygen atmosphere.

Moreover, chilling at temperatures very close to the freezing point of meat during VP storage, which has already showed several advantages for physicochemical quality of meat, was useful to maintain the microbiological quality of BB fresh meat during subsequent modified atmosphere-packed storage.

ACKNOWLEDGEMENTS

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